

Jan. 31, 1933.

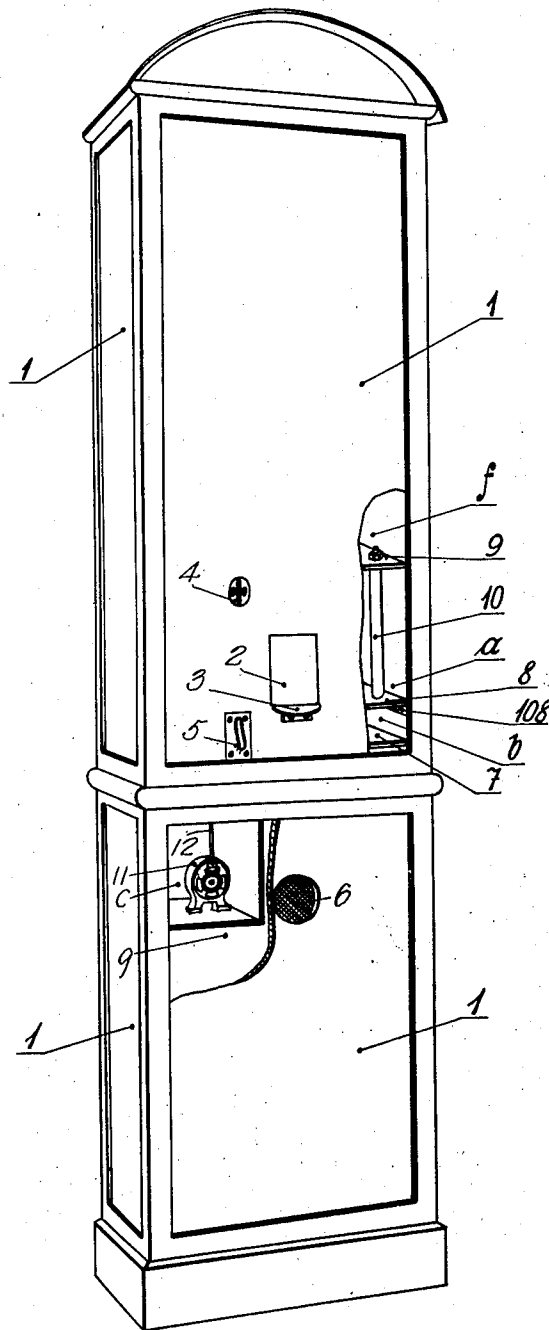
E. ASENBAUM
AUTOMATIC SELLING MACHINE

1,895,745

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7 Sheets-Sheet 1

Fig. 1.



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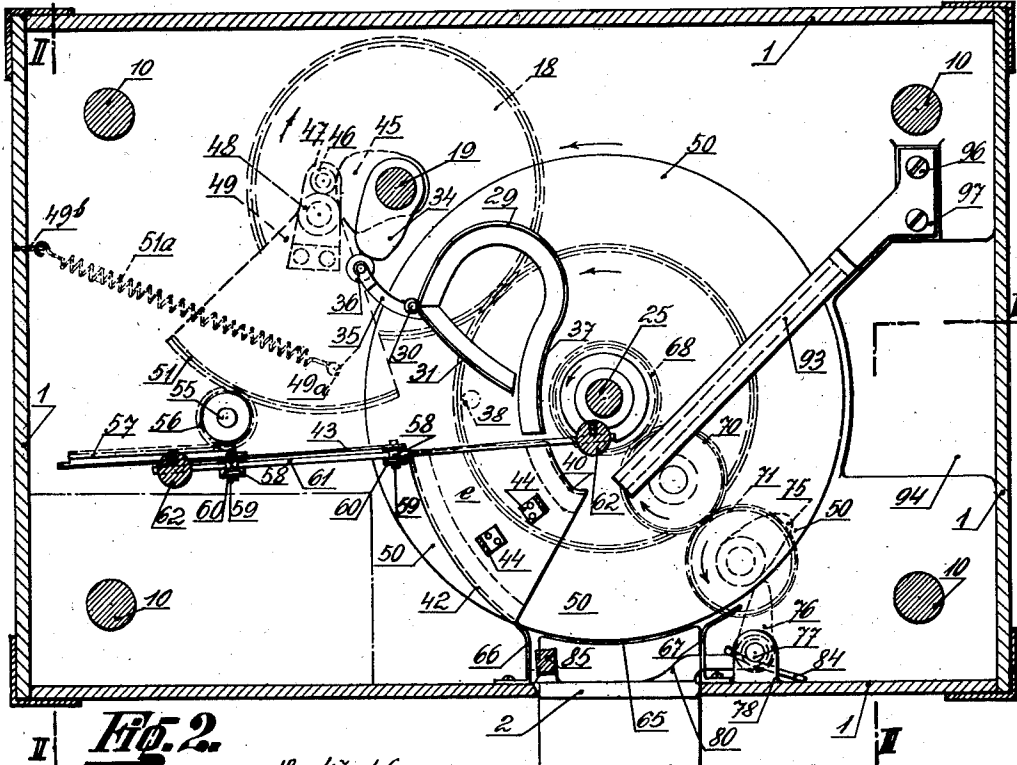


Fig. 2.

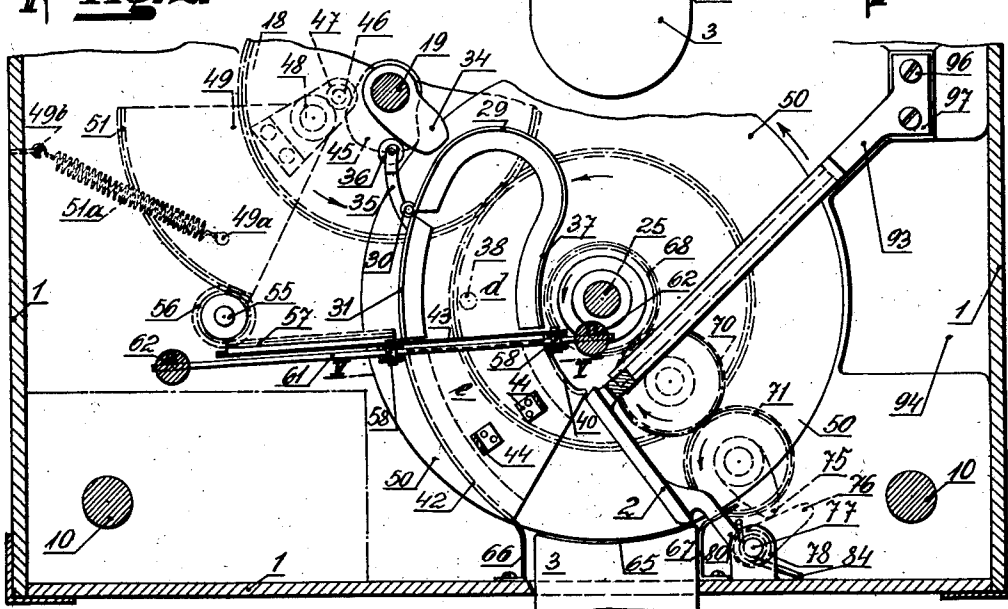


Fig. 3.

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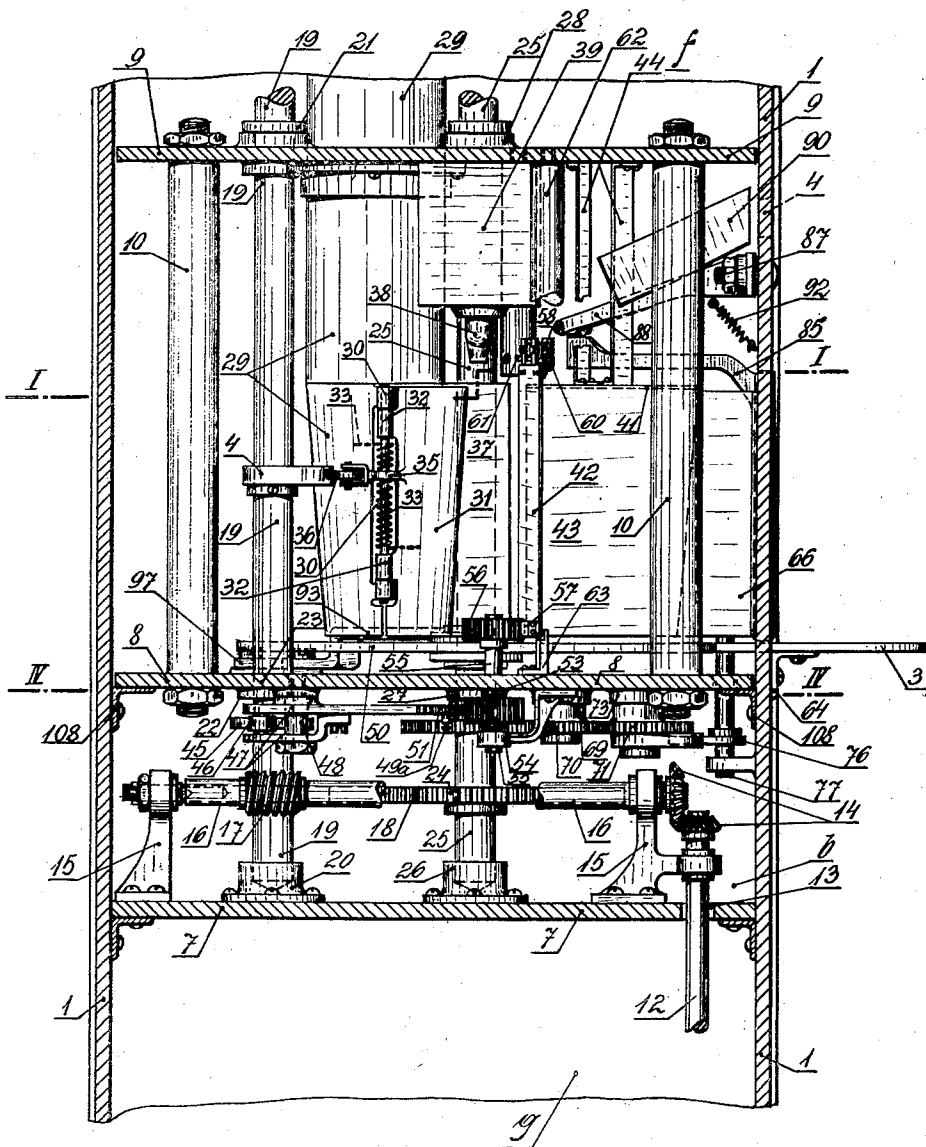
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Fig. 4.



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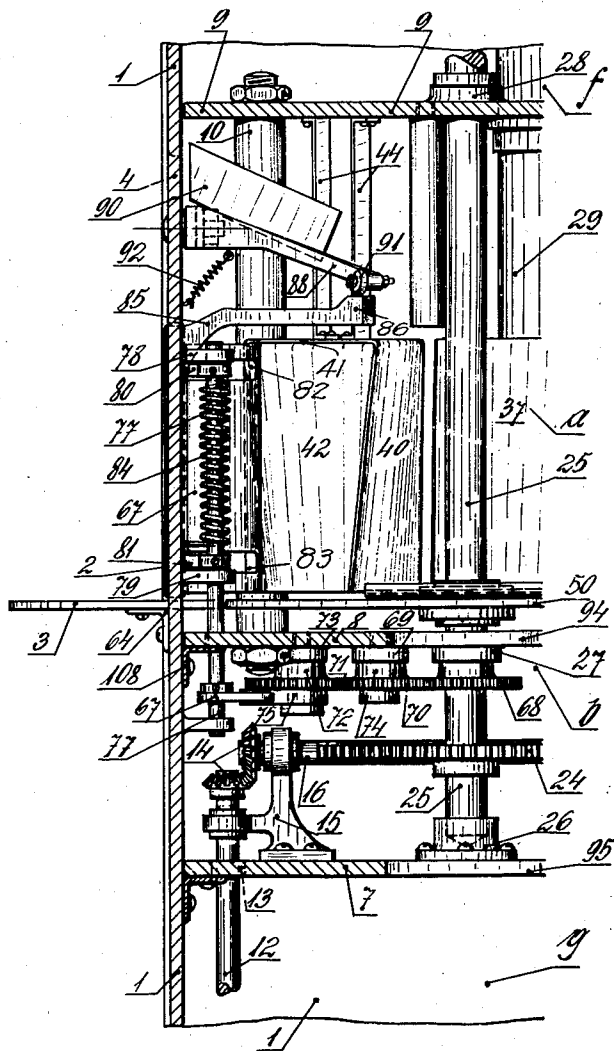
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Fig. 5.



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Fig. 10.

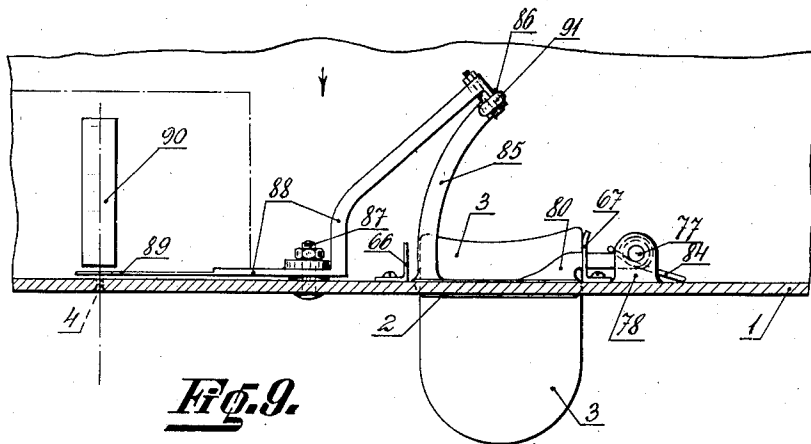
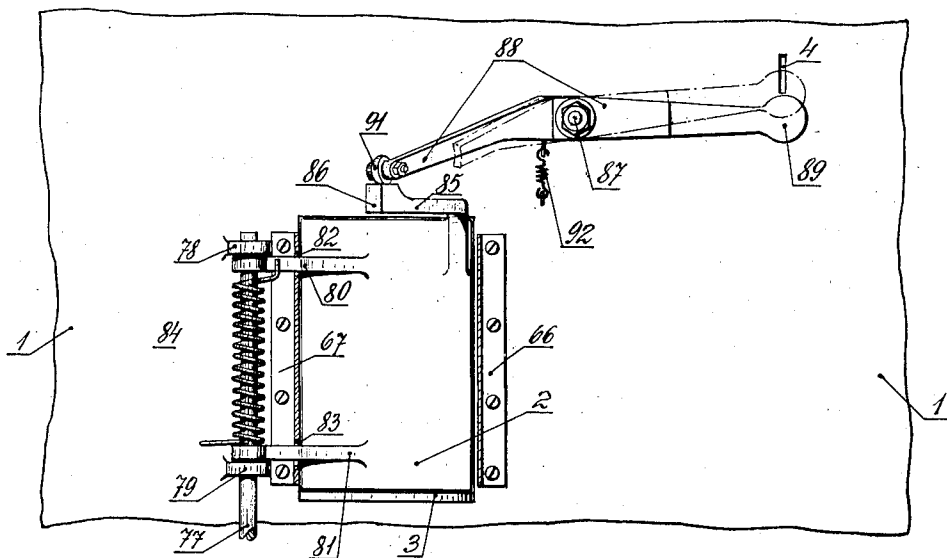


Fig. 9.



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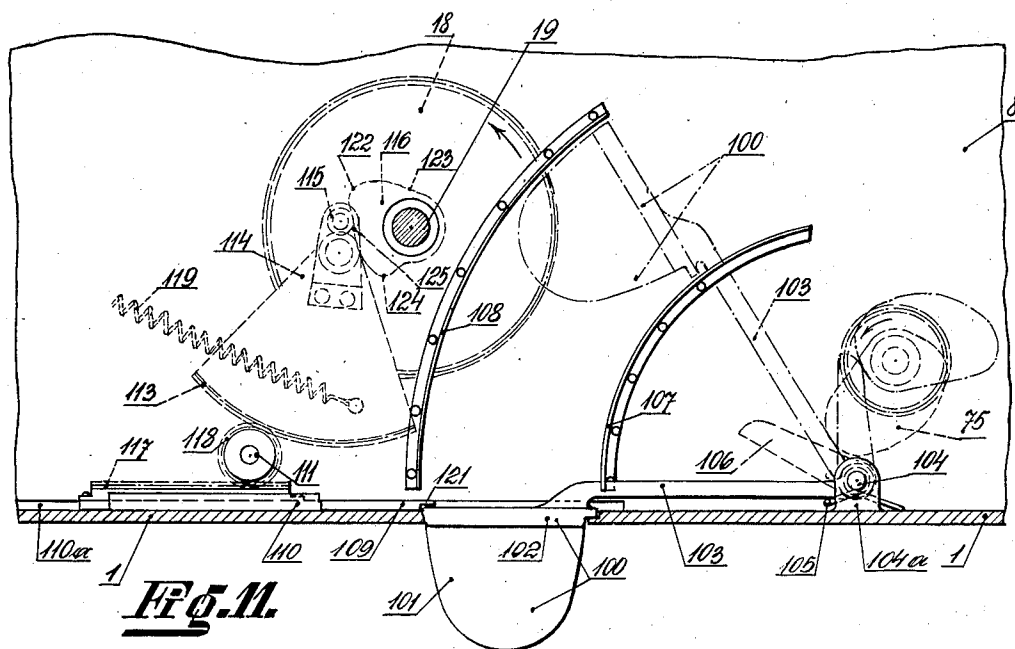
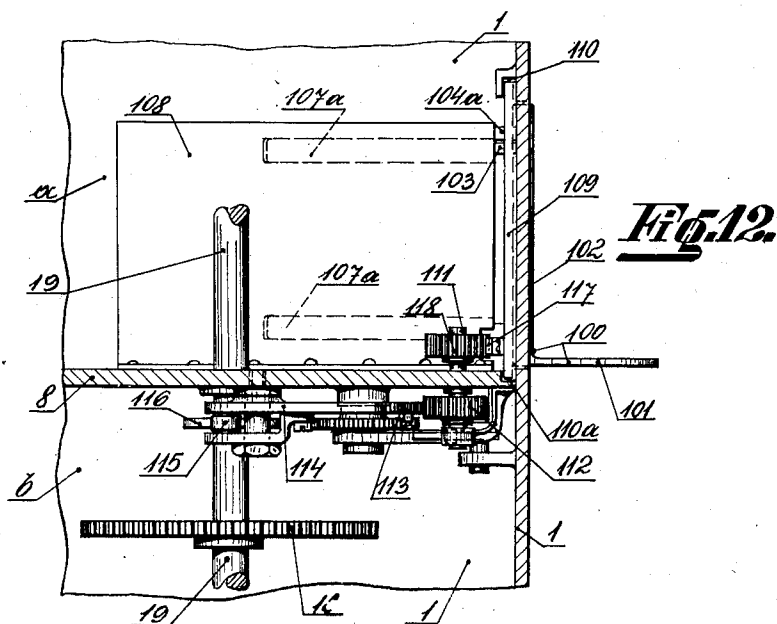
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UNITED STATES PATENT OFFICE

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AUTOMATIC SELLING MACHINE

Application filed October 31, 1929, Serial No. 403,807, and in Austria November 8, 1928.

The present invention relates to improvements in the construction of automatic selling machines, and in particular of such as are used in connection with drinks, in which filled cups are delivered through an opening from the interior of the machine.

In order to prevent the automatic drink selling machine from being put out of order by deliberately destructive or careless treatment from outside, and in order to be able to house the internal mechanism of the automatic selling machine, which is intended to be set up out of doors, in such a manner as to be perfectly protected, it is necessary to arrange for the cups to be filled automatically within the casing of the machine, and thereafter to be passed out from the interior of the machine through an opening in the casing. If now this opening were perpetually open it would provide an opportunity for wilful interference with the interior of the machine.

The object of the present invention is to provide a delivering device for automatic selling machines, in which all the functions of the machine are performed entirely in the interior of the machine, and the cups are passed out through an opening only after they have been filled, the casing of the automatic selling machine being closed throughout the entire procedure. A further object of the invention is to construct this device in such a manner that the interior of the casing, especially those parts within which the internal mechanism works, is closed against interference from outside, even during delivery of the filled cups. The filled cup is carried out by a transporting member, and the opening in the casing through which the filled cup is delivered closes as soon as the cup emerges from the casing; in such cases in which the transporting member itself also emerges from the casing through the delivery opening and is afterwards withdrawn into the interior, the delivery opening in the casing of the automatic selling machine is likewise closed as soon as the transporting member has returned completely into the interior of the casing. A further object of the invention is to provide devices for protecting the

mechanism and parts performing the functions of transporting the commodities for sale, and of closing the delivery opening against wilful damage. Further objects of the invention will become clear in the course of the following description of an example of the embodiment of the invention.

The drawings illustrate a form of construction of an automatic drink selling machine, which is provided with a delivery apparatus in accordance with the invention.

Fig. 1 is a perspective view of the exterior of an automatic drink selling machine in which, for the sake of clarity, certain parts of the front plate of the outside casing are shown broken away, in order to provide views at certain points into the interior of the machine, which are intended to make clear the position of the delivery device in the complete structure of the machine, and the position of the driving motor.

Fig. 2 is a top elevation of the delivery device of the automatic drink machine shown in Fig. 1, the present Fig. 2 being a horizontal section on the line I—I of Fig. 4 with the parts of the delivery device in a position in which the delivery opening is closed and the conducting passage *e* is open towards the back.

Fig. 3 is the same elevation as in Fig. 2 with the parts of the delivery device in the position in which the delivery opening is open and the conducting passage *e* is closed at the back.

Fig. 4 is a side elevation of the delivery device of the automatic drink selling machine and of the driving mechanism provided for this device, representing a section on the line II—II of Fig. 2 as seen from the left of Fig. 2.

Fig. 5 shows a further partial side elevation of the delivery device and its driving mechanism representing a section on the line III—III of Fig. 2 as seen from the right of this figure.

Fig. 6 is a plan view of the driving mechanism for the delivery device of the automatic selling machine representing a horizontal section on the line IV—IV of Fig. 4.

Fig. 7 shows a detail of the delivery de-

vice, and is a cross section of the conducting passage *e* on the line V—V of Fig. 3, showing the manner of attachment of the partition door which is adapted to close this conducting passage from behind.

Fig. 8 is a section on an enlarged scale through this partition door and its attachment on the line VI—VI of Fig. 7.

Fig. 9 is a view of the door which closes the delivery opening as seen from the interior of the automatic drink selling machine showing also the locking mechanism for the coin-slot which is controlled by this door.

Fig. 10 is a plan view of the parts shown in Fig. 9.

Figs. 11 and 12 show a modified form of construction of the delivery device shown in Figs. 1-10. In this modification the carrying member, which brings the drinking cup into the open, itself emerges through the opening in the casing of the machine, and serves as delivery plate; Fig. 11 is a plan view of this form of construction, while Fig. 12 is a side elevation of the same as seen from the left of Fig. 11; in both Fig. 11 and Fig. 12 only those parts of the delivery device are shown which differ from the corresponding parts shown in Figs. 1-10.

The same reference numbers apply to the same constructional parts in the different drawings.

As Fig. 1 shows, the automatic selling machine is completely enclosed by a casing 1, so that its interior is normally inaccessible. A delivery plate 3 is rigidly attached to the front of the casing of the machine. The filled cup is pushed out on this plate and removed from it by the consumer. There is further on the front of the casing a slot 4 for the insertion of coins, and an opening 5 at which the coin inserted at 4 falls out if either the mechanism is out of order or the coin inserted is false. In the lower portion of the front of the casing there is yet another opening 6, into which the used paper cups can be thrown. The space to which the opening 6 gives access is strictly separated from the space in which the mechanism is housed, so that the mechanism of the machine is inaccessible through this opening. Moreover since the devices working in connection with the openings 4, 5, and 6 do not for the most part come within the range of the present invention, a detailed description thereof is omitted in the present specification.

As can be seen, therefore, the delivery opening shown in Fig. 2 is the only opening through which the interior of the casing of the automatic selling machine can at all be accessible. This delivery opening is normally kept closed by the door 2, and is only open for the short space of time during which a filled cup is being pushed out onto the plate 3, after which it is immediately closed again. As will be hereinafter described, the im-

portant and sensitive devices in the interior of the automatic selling machine remain inaccessible even during the opening of the delivery door 2, by virtue of the special devices provided by the invention.

The interior of the automatic machine is subdivided in its height into chambers, which are separated from each other by horizontal plates 7, 8, and 9 (Fig. 1). Also the spaces in the interior of the machine which are not visible in Fig. 1 can be likewise divided up into chambers, but the details of these parts are not described in the present specification, since they do not come within the range of the invention, and may be constructed in any known manner. The horizontal plates 8 and 9 in the interior of the machine isolate a chamber *a*, which contains the delivery device together with part of the driving and actuating mechanism of the same and other accessory parts; the chamber *a* can also contain other essential parts of the automatic selling machine, but these are omitted in the drawings and not described in the specification, since they do not come within the range of the present invention. The plate 9 is carried by four vertical pillars 10 standing on plate 8, which in its turn is attached to the outer casing by means of angle-irons 108. Both plates are provided the necessary suitable openings to allow of parts of the construction to protrude from one chamber into the other. Below the chamber *a* is the chamber *b*, which is isolated above and below by the plates 8 and 7 and contains the driving mechanism of the delivery device, in its entirety or for the greater part. Above the chamber *a* the chamber *f* is situated, and below the chamber *b* the chamber *g*; the parts of mechanism housed in these two chambers *f* and *g* do not form part of the subject of the present invention, and they are therefore not further described in the present specification. In Fig. 1 the driving motor 11 for driving the moving parts of the delivery device is visible; the power-transmission consists of a bevel gear and a driving shaft 12. The motor 11 is housed in the chamber *c*; though it is to be understood that the motor could be disposed in any other desired position within the automatic selling machine, and that the motor, which is here represented as an electro-motor, could be replaced by any other type of driving motor.

In Figs. 4, 5, and 6 the driving mechanism of the delivery device, which is housed in the chamber *b*, is visible. The vertical shaft 12 from the motor passes through an opening 13 in the plate 7 into the chamber *b*, where it is connected by means of the pair of bevel wheels 14 to the horizontal shaft 16 mounted in the bearings 15. A worm wheel 17, which is mounted on the shaft 16, engages in the horizontally disposed toothed wheel 18. This toothed wheel 18 is keyed to the ver-

tical shaft 19, which is mounted in a thrust-bearing 20 and neck-journal-bearings 21 and 22 and passes through the opening 23 in the plate 8 out of the chamber *b* into the chamber *a* and through the latter on into the chamber *f*, where it can serve to drive various parts of the mechanism of the automatic selling machine, which however are not shown in the drawings, since they do not come within the range of the present invention. Power is further diverted from the toothed wheel 18 by the engagement of the latter in a toothed wheel 24, which is keyed to the shaft 25. This vertical shaft 25 has its lower end supported by the thrust-bearing 26, and is further guided by the neck-journal-bearings 27 and 28, which are disposed at the points at which the shaft 25 passes through openings in the plates 8 and 9 in order to proceed from the chambers *b* to *a* and *a* to *f*, in which latter chamber it can be employed similarly to the shaft 19 to drive various parts of the mechanism, which do not come within the range of the invention.

A disc 50 is mounted on the shaft 25, and is disposed in the chamber *a* at a short distance above the plate 8. This disc 50, which may rotate for example in the direction of the arrows shown in Figs. 2 and 3, is the carrying member, which conducts the drinking cups from the interior of the automatic drink selling machine and delivers the drinks into the open. The empty cup falls into place on this transporting disc 50 in a position towards the interior of the machine, and is carried by it to the delivery opening, since the disc extends almost up to this opening. During the rotation of the disc suitable diverting mechanism causes the cup resting on the disc to be pushed progressively towards the outside edge of the disc and finally through the opening 2 onto the plate 3.

As shown in Figs. 2-4, the empty drinking cup falls through a shaft, which is cylindrical at its upper part and tapered inwards towards the bottom, onto the disc 50, which then carries it with it. The shaft 29, which extends upwards into the chamber *f*, has its lower edge immediately over the disc 50 and issues with its upper end in a throw-off or drop device for the cups, which, as soon as the correct coin is inserted in the slot 4, is actuated and allows an empty cup to fall through the funnel of the shaft 29 onto the carrying disc 50. This throw-off or drop device can be constructed in the known manner, and, since it does not come within the range of the invention, is not shown in the drawings. In the detailing of the procedure of delivery in the automatic drink selling machine it is therefore sufficient to note that every time a coin is correctly inserted in the slot an empty cup is caused to drop through the shaft 29.

In order to eliminate the possibility of the cup assuming a wrong position or fall-

ing over on reaching the travelling disc 50, a portion 31 of the wall of the lower part of the shaft 29 is replaced by a sprung flap door, which is capable of turning about a vertical axle 33 and of closing in such a manner that the shaft extends downwards, in the form of a funnel completely closed in on all sides, until just above the travelling disc. This door is however normally drawn back by the spring 30 into a position which leaves the lower portion of the shaft open on one side, so that the cup, after reaching the carrying disc 50, can be carried out of the shaft by the opening thus formed. The drive for actuating the turning motion of this rotatably mounted flap door 31 on the vertical axle 33 in the bearings 32 is derived from the vertical shaft 19. This shaft 19 is provided with a cam 34, which engages with a roller 36, which is rotatably mounted in the forked end of an arm 35 attached to the flap door 31. The spring 30 is fitted on the vertical axle 33, and has its one end supported by the flap door 31 and its other by the fixed portion of the funnel 29, in order to retain the flap 31 normally in the open position shown in Fig. 3. As the shaft 19 turns, the cam 34 is brought into the position in which it presses the roller 36 together with the arm 35 outwards against the action of the spring 30, whereupon the flap door 31 is moved into the position shown in Fig. 2, so that the cup, which falls down the shaft 29 at this same moment, is held in position and prevented from falling over as it drops onto the disc 50. As the shaft 19 is further turned, the cam 34 slips off the roller 36 and the spring 30 causes the flap door 31 to return to the position shown in Fig. 3, so that the cup now standing stationary on the carrying disc 50 can be conducted out of the shaft 29 by this disc 50 through the opening freed by the flap door 31.

Opposite the open flap door 31 (Fig. 3) the lower part of the shaft 29 is extended to form a wall 37, the lower edge of which lies just above the surface of the disc 50 and which, together with the open flap door 31 forms an open passage within which the cup carried by the transporting disc 50 is free to move. The path of the cup is thus in this section of its length only limited laterally by the walls 31 and 37 (see Fig. 3) and is open above. Above this passage *d* is situated the mouth 38 of the filling device 39 (Fig. 4) the details of which are neither shown in the drawings nor included in the specification, since it does not come within the range of the invention. It is sufficient to note that the filling device is fixed, that is to say it does not travel with the cup during the filling procedure. The flow of the required liquid from the mouth 38 of the filling device 39 must therefore be so regulated that it only takes place during the short

space of time during which a cup passes under the mouth 38, and that it flows at the speed and to the extent necessary to fill the cup neither more nor less than to the required height. The means necessary for regulating the flow of the liquid, valves and the like, are neither illustrated nor described, since they do not form an essential part of the present invention. The position of the mouth 38 is indicated by broken and dotted lines in Figs. 2 and 3.

After travelling through the open passage *d*, the cup, on its way to the delivery opening, enters a conduit-like space *e*, which is limited laterally by the side walls 40 and 42 (Fig. 7), above by the cover 41, and below by the disc 50 itself, so that the filled cup when it reaches this passage is cut off on both sides and above from all the remaining parts of the automatic selling machine. This guiding passage *e* can however also be closed at the back by a door 43, which is in the form of a sliding door and can be so slid in between the spaces *d* and *e* so that it completely shuts off the conduit *e* from the open passage *d*. When the door 43, which thus forms the back wall of the space *e*, is pushed into position, as shown in Fig. 3, the conduit *e* is open only towards the front, i. e. towards the delivery opening, and completely shuts off the inner portions of the automatic selling machine from outside. When, on the other hand, the door 43 is open, as shown in Fig. 2, a filled cup is free to be conducted by the disc 50 from the space *d* into the space *e*. The guiding conduit *e*, built up of the walls 40, 41, and 42, is suspended from the plate 9 by means of L-shaped iron members 44.

The side walls 31, 37 of the passage *d* and 40, 42 of the passage *e* are disposed slightly eccentrically to the carrying disc 50, so that the cup in the course of being transported by the disc 50 is caused to move in relation to the disc. By being compelled to move within the described side walls, the cup is induced towards the outside edge of the disc, and thus also towards the delivery opening, since the inner side walls 37 and 40 act as scrapers. When the said side walls and the distance between them are correctly determined, the cup can be caused to turn on its own axis as it passes between these side walls. Having arrived finally in front of the exit of the conduit *e*, the cup is situated in front of the opened door 2, which, just at this moment, assumes the position shown in Fig. 3, and transports the cup through the delivery opening 2 onto the plate 3 in a manner to be described later.

The delivery opening is kept permanently closed by the door 2, except during delivery of the cup. In order to render the inner portions of the machine inaccessible from without even during the moment of delivery, the following arrangement is made. The filled

cup passes, while the delivery opening is still closed and after the partition door 43 has been opened, from the space *d* into the conduit *e*, whereupon the door 43 shuts off the space *e* again from behind, as shown in Fig. 3, and remains in this position as long as the delivery opening 2 is completely or partially opened. The inner portions of the machine are thus permanently closed from outside either by the door 2 (Fig. 2) or, when the latter is open, by the walls 40, 41, and 42 of the space *e* and the disc 50. As soon as the door 2 is closed, the partition door 43 can open to make way for another cup. The system is thus similar to that of a lock on a river, in that one of the two doors 2 and 43 is always closed.

The movement of the door 43 is effected in the following manner by the main drive of the delivery device. The shaft 19 is provided with a cam 45, which is disposed within the chamber *b* immediately below the plate 8 and engages a roller 46. This roller 46 is freely rotatable in the fork-shaped end 47 of a lever 49, which is rotatably mounted on a pin 48 attached to the plate 8, and the other end of which is sector-shaped and provided with a segment of a toothed wheel 51, which engages in a pinion wheel 52 (Figs. 4 and 6), which is keyed to a vertical axle 55 mounted in bearings 53 and 54 below the plate 8. The axle 55 projects through an opening in the plate 8 into the chamber *a*, and is fitted at its free end within this chamber with a second pinion 56, which engages in a toothed rod 57. The toothed rod 57, which has a horizontal position and moves horizontally, is attached by means of screws to the lower end of the door 43, so that the rotation of the toothed wheel 56 and thus indirectly, through the toothed wheel segment 51, the rotation of the shaft 19, is converted into a straight-line movement of the sliding door 43. A tension spring 51*a* is interposed between the left wall of the casing 1 and the toothed wheel segment 51, the one end of this spring being attached to the casing 1 at 49*b* and the other end to the toothed wheel segment 51 at 49*a*. This spring tends to move the toothed segment 51 and with it also the sliding door 43 into the position shown in Fig. 3. The sliding door 43 is provided at its upper end with two rollers 58, of which each is rotatably mounted by means of a horizontal axle 59 (Fig. 8) in a U-shaped bearing 60 which is fastened to the door by means of angle pieces 60*a*. The rollers 58 run on a horizontal rod or rail 61, the ends of which are attached to the lower ends of vertical rods 62, the upper ends of which are fastened by means of screw connections to the plate 9. The door 43 is thus suspended and runs on the rollers 58. A screwed-on strip 63 (Figs. 4 and 8) is fitted along the lower edge of the door 43 and attached to the plate 8, for the purpose of pre-

venting the door from becoming displaced or dislodged laterally.

The cup, after arriving through the conduit *e* at a position immediately behind the door 2, is pushed out on to the plate 3 by the door 2, which opens at the right moment and closes again as soon as the cup has left the machine. In order to ensure a steady movement of the cup without spilling of the contents the plate 3 is disposed at exactly the same level as the carrying disc 50, is firmly attached to the casing 1 by angle irons 64, and projects into the interior of the machine to within a very short distance of the edge of the disc, leaving only the slight clearance gap 65. Further to this same end the outer side wall 42 of the chamber *e* is extended up to the inner surface of the front wall of the casing 1 and is tightly fitted to the latter by means of the curved angle plate 66. A similar plate 67 is provided on the other side of the opening, the two forming abutments to the opening as in the approach to a gateway.

As already mentioned, the opening and shutting movement of the door 2 must stand in a certain relation to the rotating movement of the disc 50 and to the movements of the remaining elements of the transporting and delivering mechanism, since the door 2 must open each time at the right moment before the filled cup reaches it, and on the other hand must not open until the partition door 43 has closed behind the conduit *e*, and must further close and remain closed as soon as the filled cup has passed beyond it. All this is effected by causing the door to be actuated by the main drive of the whole delivery device.

For this purpose the drive for the movement of the door 2 is derived from a toothed wheel 68, which is situated in the chamber *b* close under the plate 8 and firmly keyed to the shaft 25. This toothed wheel 68 is the first of a set of three toothed wheels in engagement—68, 70, and 71, of which the second (70) is mounted at 69 on the vertical axle 74, and the third (71) is mounted on the vertical axle 72, the upper end of which is mounted in a bearing at 73 in the plate 8. A cam 75 is mounted on the axle 72 beneath the toothed wheel 71 and turns with the wheel 68, when the latter is driven by the shaft 25. The cam during rotation comes into periodical engagement with the arm 76 which is attached to the axle 77 of the door 2, and the rotating movement of which, in a clock-wise direction, as shown in Figs. 2, 3, and 6, brings about the opening movement of the door 2. The closing of the door 2 is effected by means of a spring. The vertical axle 77 of the door 2, which is mounted in the bosses 78 and 79 on the casing plate 1, is connected to the rear side of the door 2 by means of two arms 80 and 81 (see Fig. 9). During the rotating movement of the door 2

these two arms 80 and 81 move in slits 82 and 83 in the abutment plate 67. A spiral spring 84 is disposed round the axle 77 of the door 2, with its one end supported against the inner surface of the front wall of the casing 1, while its other end presses against the rear side of the arm 80 on the door 2. The spring 84 is thus so arranged that it normally presses the door 2 into the position in which it closes the delivery opening of the automatic selling machine.

The shape and position of the cam 75 and of the arm 76 are so determined that these two members come into engagement with each other precisely at the moment in which the filled cup is travelling in the conduit *e* and the partition door 43 has closed the rearward opening of the conduit *e*. As soon as the cam engages the arm, the latter together with the vertical axle 77 is turned, whereby the door 2 is opened and assumes the position shown in Fig. 3. As soon as the filled cup has passed in front of the opened door 2 the cam 75, which has meanwhile rotated further, comes out of engagement with the arm 76, and the spring 84 returns the door 2 rapidly into the closed position, pushing the filled cup in front of it through the delivery opening of the automatic drink selling machine on to the plate 3.

The operation of the entire delivery device after insertion of a coin in the slot 4 is thus as follows: The insertion of the coin effects on the one hand the setting in motion of the drive of the delivery device, and on the other hand the dropping of an empty cup from the throw-off device through the funnel 29 onto the disc 50. The motor 11 rotates the shaft 19 through the intermediary of the shaft 12, bevel gear 14, shaft 16, worm wheel 17, and cog-wheel 18, and simultaneously rotates the carrying disc 50 through the toothed wheel 24 and the shaft 25. At the same time the rotation of the shaft 25 is transmitted through the toothed wheels 68, 70, and 71, and the shaft 72 to the cam 75. The rotation of the shaft 19 effects, by means of the cam 34, the temporary shutting of the flap door 31 of the shaft 29 which steadies the cup at the moment of impact. As soon as the cup has dropped the flap door 31 is opened again, and the empty cup is carried by the disc 50 under the mouth 38 of the filling device, where it is filled in passing. Since at this time the roller 46 is travelling on the raised portion of the track of the cam 45, the spring 51*a* is in tension and the toothed segment 51 and the sliding door 43 are in the position shown in Fig. 2, so that the rearward opening of the conduit *e* is open. The filled cup thereupon enters the conduit *e* by the rearward opening, and, since the further rotation of the shaft 19 brings the roller 46 onto the receding portion of the track of the cam 45, the toothed segment 51 is moved by

the spring 51a into the position shown in Fig. 3. This movement is transmitted by the pinions 52 and 56 and the toothed rod 57 to the partition door 43, so that the latter is moved into the position in which it closes the rear opening of the conduit *e*. As soon as this has taken place, and while the disc 50 is still in rotation, the cam 75 comes into engagement with the arm 76 of the door 2 and the latter is opened. As a result of the further rotation of the disc 50 and of the deflecting effect of the inner side wall 40 of the passage *e*, the cup is now brought into a position in front of the opened door 2, whereupon the latter, in consequence of the disengagement of the cam 75 from the arm 76 and of the action of the spiral spring 84, closes and pushes the filled cup out through the delivery opening onto the outside plate 3, thus concluding the delivery procedure. The actuating mechanism of the partition door 43 has also in the meantime—after the closing of the door 2—returned to the position shown in Fig. 2.

It is clear from the preceding description that the closing mechanism of the delivery opening is constructed in such a manner as to be resilient or yielding. This arrangement in itself provides a protection against certain wilful or careless acts capable of damaging the mechanism of the automatic selling machine. As an example of such damage, it may easily happen that a hard object becomes lodged in the delivery opening and jammed there by the closing of the door. Where rigid closing mechanism is used this occurrence can easily cause the fracture or damage of certain parts of the mechanism, which is not the case when these parts are so constructed as to allow of their yielding to the influence of force.

A further protection of the internal mechanism is achieved by the provision of a device which locks the coin-slot as long as the delivery opening is not completely closed. This slot locking device is visible in Figs. 9 and 10. The door 2 is provided with an arm 85 which extends into the interior of the machine and the upper surface of which takes the form of a curved track which, at the outer end of the arm 85, rises suddenly to a step 86 formed by the thickening of the end of the arm. A two-armed lever 88 is rotatably mounted on a horizontal axle 87 attached to the wall of the casing 1, one arm of the lever extending with a disc-shaped end 89 up to the immediate neighbourhood of the slot 4 for the insertion of coins and capable of covering this slot, for which purpose it is thrust into a position between the slot and a channel 90 for the coins disposed obliquely into the interior of the casing. This channel 90 and the parts of the mechanism to which it leads (the space therefor is indicated in outline in broken and dotted

lines in the drawings) are not further described, since they do not come within the range of the invention and may be constructed in any known manner. The second arm of the lever 88 is suitably bent and is provided at its end with a roller 91, which is adapted to run on the curved track provided by the upper surface of the arm 85 and is pressed down on to this track by the spring 92 which connects the lever 88 with the casing 1. The arrangement is such that the roller 91 comes to rest on the raised end 86 of the arm 85 when the door 2 of the delivery opening is completely closed. In this position the coin slot 4 is freed by the disc-shaped end 89 of the lever 88, as indicated by the position shown in full lines in Fig. 9. If the door 2 is not quite closed the roller 91 runs down from the raised step of the curved track on the arm 85 on to its lower portion, and the lever 88 assumes the position shown in dotted and broken lines in Fig. 9, in which the slot 4 for the coins is completely or partly locked.

Although the described means and devices are capable of permanently protecting the internal parts of the automatic drink selling machine against abuse and damage from outside, it can yet happen that for any chance reason the cup does not reach the delivery plate in front of the casing, but remains behind the delivery opening in the interior of the casing or is momentarily thrust back into the interior of the casing before the delivery opening is completely closed. This however would lead to a confusion at the next insertion of a coin, since the newly filled cup would come into conflict with the one that had remained behind. A safety device against this contingency also is provided by the present invention, by arranging for the removal within the machine of the stranded cup or other hindrance on the insertion of a fresh coin. When a fresh coin is inserted and before a fresh cup emerges from the conduit *e* the door 2 opens in the manner already described and thereby pushes with its reverse side the stranded cup or other hindrance on to the travelling disc 50, which carries it to a scraper 93, which is shaped like a ruler and has its lower edge just above the surface of the disc 50. This scraper bars the way to the discarded cup and causes it to be pushed off the disc 50 through an opening 94 in the plate 8 and further through a corresponding opening 95 in the plate 7 to fall finally into a space (not shown in the drawings) provided in the chamber *g* for used cups. The scraper 93 is fastened to the plate 8 at 97 by means of screws 96.

In Figs. 11 and 12 a modified form of construction in accordance with the invention is shown, in which, instead of the travelling disc 50, a carrier 100 serves as the transport-

ing member for the cup and in contrast to the disc 50 passes itself through the delivery opening and thus fulfils also the functions of the plate 3 in the previous example. This carrier 100 consists of a horizontal plate 101 of a shape similar to that of the plate 3 of the previous example, and of a vertical plate 102 attached to the rearwards edge of the plate 101 and adapted to fit exactly into the delivery opening, so that it can close the opening in the manner of a door. The carrier 100 thus combines the functions of the disc 50, the plate 3, and of the door 2 in the previous example.

For this purpose the carrier 100, which like the door 2 can perform a rotating movement about a vertical axle 104, is mounted in a manner similar to that of the door 2 and is likewise actuated by the main drive. The vertical plate 102 is thus held by arms 103 attached to the vertical axle 104, which is mounted at 104a in the casing 1, and can be turned together with the axle 104 against the pressure of a spring 105, the door thus performing an arc-shaped movement. The opening of the door is effected by a spiral spring 105 which is wound round the axle 104 and of which the one end rests against the inner surface of the casing 1 and the other end against the front surface of one of the arms 103. The rotation of the axle 104 is again effected by the engagement of an arm 106 attached to the axle with the cam 75 (see Figs. 2, 3, and 5). When the delivery opening is closed by the door 102 (position shown in full lines in Fig. 11) the tongue 106 engages the raised portion of the cam 75 and the spring 105 is in tension, while in the position of the parts shown in broken and dotted lines in Fig. 11 the door 102 (i. e. of the carrier 100) is so situated that the tongue 106 is in engagement with the receding portion of the cam 75 and the spring 105 is correspondingly relieved.

During its opening and closing movements the carrier 100 moves between arc-shaped curved walls 107, 108, which are attached to the plate 8 of the casing. The inner side wall 107 is provided with horizontal slits 107a, in which the arms 103 of the carrier are free to move.

In the inwardly swung position of the carrier 100, which is indicated in Fig. 11 in broken and dotted lines, the horizontal plate 101 of the carrier is situated underneath the device (not shown) for disposing of, i. e. letting fall, the empty cups. On the insertion of the coin to which the automatic drink selling machine responds, an empty cup is made to fall on to the plate 101 of the carrier 100, for which purpose a shaft or funnel may be used similar to that of the previous example. The driving mechanism of the carrier 100 is simultaneously set in motion, and the cam 75 is so turned that the spring 105 effects

the swinging of the carrier inwards until it comes under the throw-off device, when an empty cup falls on to the plate 101. Then in consequence of the further rotation of the cam 75 and of the engagement of the same with the tongue 106, the carrier 100 is brought back into the position in which the vertical plate 102 closes the delivery opening and thus also the interior of the casing. During the closing movement of the carrier 100 the plate 101 carries the cup clear of the machine. In the course of this procedure the cup passes for a short time under the mouth of the filling device and is filled in the same manner as in the previous example. The filled cup, which has been standing throughout undisturbed on the plate 101, attains together with this plate a position in front of the delivery opening, thus concluding the delivery procedure.

The vertical closing plate 102 closes the delivery opening of the casing only in the foremost position. In order not to leave the delivery opening open during the inward movement of the closing plate 102—which would permit of wilful interference from outside with the interior of the machine—the delivery opening is immediately closed, as soon as the carrier 100 has travelled so far on its inward course that the plate 101 is in its entirety situated within the interior of the casing, by means of a sliding door 109, which is disposed behind the front plate of the casing and is capable of being pushed across behind the delivery opening. During the outward movement of the carrier 100 the sliding door 109 is moved back in time to allow of the free passage of the carrier through the delivery opening.

The movements of the sliding door 109 are actuated indirectly by the main drive of the delivery device in a manner similar to that employed in connection with the partition door 43 in the previous example of an embodiment of the invention. The sliding door 109 travels with its upper and lower edges in guides 110 and 110a, which are attached to the casing wall 1 and to the plate 8 respectively, and is provided at its lower end with a horizontal toothed rod 117, which engages in a horizontal pinion 118, which latter pinion is driven by the shaft 19 (see Figs. 2, 3, and 5) through the intermediary of the axle 111, pinion 112, toothed segment 113, lever 114, roller 115, and cam 116. A spring 119 which is attached to the end of the toothed segment 113 and is fastened similarly to the spring 59a tends to keep the door 109 permanently closed. A vertical extension 121 (Fig. 11) on the right of the door 109 projects somewhat over the delivery opening for the purpose of locking or bolting the carrier 100, when the latter is in its extreme outward position, i. e. when it closes the delivery opening. In this manner the wilful pressing

back of the closing plate 102 and interference with the interior of the casing, when the parts are in the positions shown in Fig. 11, is effectively prevented. When a coin is inserted and the driving mechanism thereby set in motion, the excrescence 122 on the curved outside edge of the irregular cam-disc 116 engages the roller 115 and causes the sliding door 109 (Fig. 11) to be moved first slightly towards the left, so that the locking of the closing plate 102 is released and the latter is free to travel inwards in the manner already described. As soon as the carrier 100 has travelled far enough into the interior of the machine the irregular cam-disc 116 has also turned so far that the roller 115 has come in contact with the receding portion 123 of the curved edge of the disc, with the result that the spring 119 effects the movement of the sliding door 109 towards the right and thus the closing of the delivery opening. The further rotation of the drive and thus of the shaft 19 brings the roller on to the raised portion 124 of the cam-disc 116, so that the sliding door 109 is again moved towards the left, while the carrier 100 is simultaneously moved through the delivery opening towards the outside. As soon as the latter movement is completed, the roller 115 runs into a slight depression 125 between the two raised portions 122 and 124 of the edge of the cam-disc 116, with the result that the sliding door 109 performs under the influence of the spring 119 a slight movement towards the right (Fig. 11) thus thrusting the extension 121 of the sliding door 109 behind the vertical plate 102 in the manner of a door-bolt.

It goes without saying that the construction and arrangement of the single parts of the automatic selling machine can deviate in innumerable ways from the described examples of forms of construction, without proceeding beyond the limits of the present invention.

The mechanism here described is equally well adaptable for use in connection with automatic selling machines for other than liquid commodities, in which case the containers for the goods in question (plates, boxes, cups or the like) are caused to fall on to a carrier inside the casing of the machine, are then filled with the goods, and then transported through an opening through the outside wall of the casing by the horizontally moving carrier.

I declare that what I claim is:—

1. In a device of the class described, a rotary conveyor, an empty-cup conduit opening over the central portion of said conveyor, said conduit having means therein for stabilizing the empty cup on the conveyor, cup-filling means opening downwardly into the space between the end of the conduit and the front of the machine, a housing for the filled

cups supported eccentrically curved over the conveyor and opening on the outside of the casing, a device for shutting off the cup-filling means from the outside, and means for intermittently operating said closure to allow the filled cups to be conveyed to the outside.

2. In a filled-cup vending machine having a cup-supplying device, a rotating disc for conveying filled cups to the outside and a delivery door, means for removing a stranded cup from the rotating disc, comprising means for opening the delivery door inwardly to push the stranded cup onward away from the door before the following fresh cup is conveyed to the door and a scraper baffle arranged above the surface of the disc in juxtaposition therewith to thereby bar the further passage of the stranded cup and push it off the disc for further disposal.

3. In a machine for vending filled-cups, a casing, means therein for supplying empty cups, means therein for delivering the cups to a filling device, a delivery door in said casing, means therein for opening said door, means therein for delivering the filled cups through the open delivery door out of the casing to the consumer, and means therein for keeping the operating mechanism inaccessible from outside even in the open position of said delivery door.

4. In a machine for vending filled-cups, a casing, means therein for supplying empty cups, means therein for delivering the cups to a filling device, a delivery door in said casing, means therein for opening said door, spring means for normally holding said door open outwardly, means therein for delivering the filled cups through the open delivery door out of the casing to the consumer, and means therein for keeping the operating mechanism inaccessible from outside even in the open position of said delivery door.

In testimony whereof I affix my signature.
ERNEST ASENBAUM.